

Application Number: 09/719,960

Docket: 14249

REMARKS

In the Office Action mailed February 18, 2005, Claims 23, 24, 27-35, 37-39 and 46 have been rejected under 35 U.S.C. § 103(a) as allegedly rendered obvious by U.S. Patent No. 5,874,219 to Rava et al. ("Rava et al.") in view of U.S. Patent No. 5,556,961 to Foote et al. ("Foote et al."). The Examiner has alleged that Rava et al. disclose an apparatus comprising an array of test sites on a chip and further comprising an array of pixels of a CCD, and has acknowledged that Rava et al. "do not teach incorporating a mask between the elements or spots of the array." However, the Examiner has alleged that Foote et al. "teach explicitly of incorporating a mask into an array" and that it would have been obvious to incorporate such a mask with the apparatus of Rava et al. to allow for a matrix of discrete cells.

The rejection relies solely on an embodiment of Rava et al. in which a biological chip containing an array of probes is attached to the bottom of a microtiter well (see Rava et al. at Figs. 5 and 6 and Col. 8, l. 29-34), since this is the only embodiment for which the Examiner has alleged that Rava et al. teach simultaneous detection of light from a plurality of predetermined regions corresponding to probes in the array within the microtiter well. The Examiner has conceded that Rava et al. do not teach incorporating a mask as taught by Foote et al. between the probes, but has alleged that it would have been obvious to incorporate a mask between the probes in such an array.

The claims of the present invention are directed to an apparatus having a sample receptacle comprising an array of reaction sites and masking means between the reaction sites of

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the array. It is clear from the specification that the masking means reduce the transmission of light between the reaction sites. Specification at p. 5, l. 29-p. 6, l. 17.

Applicants respectfully submit that the claimed invention is not obvious in view of Rava et al. and Foote et al. since: 1) there would have been no motivation to combine the references because, inter alia, Rava et al. teach away from the use of masking means; and 2) the combination of references fails to achieve the present invention because Foote et al. simply fail to teach masking means between reaction sites in an array.

It is well-established that the prior art must be considered in its entirety, including portions that teach away from the claims. W. L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 U.S.P.Q. 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). See also M.P.E.P. § 2141.03.

Thus Rava et al. must be considered in its entirety, including the numerous portions that repeatedly and consistently teach that the biological chip is transparent to light in embodiments involving optical detection. Specifically, Rava et al. teach that:

Substrates that are transparent to light are useful when the method of performing an assay on the chip involves optical detection. Col. 4, l. 13-15.

The light passes through the chip plate since it is transparent to at least this wavelength of light. Col. 5, l. 45-46.

In another embodiment, the laser is placed below the biological chip plate and light is directed through the transparent wafer or base that forms the bottom of the biological chip plate. Col. 6, l. 25-28.

FIG. 5 depicts a cross section of this embodiment [of the biological chip plate], showing the wafer 510 having a substrate 520 (preferably transparent to light) and a surface 530 to which is attached an array of probes 540. Col. 8, l. 18-21; Fig. 5.

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When the assay is to be performed by sending an excitation beam through the bottom of the plate collecting data through the bottom of the plate, the body of the plate and the substrate of the chip should be transparent to the wavelengths of light being used. Col. 8, l. 63-67.

Accordingly, not only do Rava et al. fail to teach or suggest the use of masking means, but Rava et al. repeatedly teach to the contrary, i.e., that the biological chip is transparent. The reference must be considered as a whole, including the portions cited hereinabove that clearly teach away from the present invention.

Thus there is no suggestion or motivation in Rava et al. to modify its apparatus by incorporating a mask. Foote et al. similarly fail to provide the motivation. Even if, arguendo, Foote et al. disclose a mask between the probes of an array (and Applicants submit it does not), Foote et al. do not provide motivation to modify the apparatus of Rava et al. The Examiner alleges only that the "ordinary artisan would have been motivated to have incorporated such masks into the device of Rava et al., for as seen above, Foote et al., at column 7, teaches explicitly of their ease and precision of use." Office Action mailed February 18, 2005 at p. 4. The passage of Foote et al. cited in the Office Action states only that "[p]hotolithographic masks are easily prepared and positioned with great precision." Foote et al. at Col. 7, l. 14-15. Applicants respectfully submit that such teaching does not provide motivation to combine the references.

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 682, 16 U.S.P.Q.2d 1430, 1432 (Fed. Cir. 1990). See also M.P.E.P. § 2143.01. In making the assessment of differences between the prior art and the claimed subject

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matter, 35 U.S.C. § 103 specifically requires consideration of the claimed invention “as a whole.” This “as a whole” instruction prevents evaluation of the invention part by part. Ruiz v. A.B. Chance Co., 357 F.3d 1270, 1275, 69 U.S.P.Q.2d 1686, 1690 (Fed. Cir. 2004). Without this requirement, an obviousness assessment might break the invention into its component parts, then find a prior art reference corresponding to each component. This improper method would import hindsight into the obviousness determination by using the invention as a roadmap to find its prior art components. Princeton Biochemicals, Inc. v. Beckman Coulter, Inc., No. 04-1493, slip op. at 8 (Fed. Cir. June 9, 2005). Simply identifying all of the elements in a claim in the prior art does not render a claim obvious. 35 U.S.C. § 103 requires some suggestion or motivation in the prior art to make the new combination. Id. at 10. Because there is no suggestion or motivation in the prior art to combine the teachings of Foote et al. and Rava et al., a prima facie case of obviousness has not been established.

In addition, the prior art references fail to teach or suggest all of the claim limitations. Foote et al. simply fail to teach or suggest a masking means between reaction sites on an array.

Foote et al. teach a photolithographic method for the synthesis of a microarray. In this method, a photolithographic mask is placed over a derivatized substrate, and light is caused to pass through transparent areas of the mask onto photolabile groups on the substrate. A series of blocking and illumination steps result in production of a microarray having cell areas that are reactive with a selected molecule and boundary areas that are non-reactive. As clearly shown in Figs. 2-4 of Foote et al., the photolithographic mask does not become incorporated into the microarray.

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For example, Fig. 2 of Foote et al. depicts a method of synthesizing a microarray. A photolithographic mask (16) is placed over a substrate (10) that has been coated with a photolabile group X. The photolithographic mask has transparent regions (18) and an opaque region (20). Light penetrates the transparent regions and labilizes the X groups that are exposed, leaving a protected portion (22). The photolithographic mask is removed and the substrate is treated with a non-photolabile blocking group B. A second illumination step (in the absence of a photolithographic mask) results in the formation of a layer (10) having a cell area (26) that is reactive and a boundary area that is non-reactive and non-photolabile. The boundary areas in the array of Foote et al. are thus defined by their chemical non-reactivity, not by a photolithographic mask.

Further, since the photolithographic masks are used by Foote et al. only to prepare the array, there would have been no motivation to incorporate such a mask into the array of Rava et al.

Accordingly, a prima facie case of obviousness has not been established.

Applicants provide the following comments with respect to the Advisory Action mailed June 9, 2005. The Advisory Action states that "[a]greement seems to be reached in that U.S. Patent 5,556,691 (Foote et al.) teaches using a mask in conjunction with an array of reaction sites." Applicants respectfully disagree. Foote et al. disclose the use of a photolithographic mask in the preparation of a microarray of chemical products in which cells and boundaries are defined by chemical reactivity and non-reactivity, respectively. The photolithographic mask is not incorporated into the array.

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The Advisory Action further states that “[w]hile Foote et al. does teach removing the specific areas of the mask, e.g. areas where a compound is to be added, Foote et al. also teach that the mask is retained on the surrounding areas.” Applicants disagree, and can find no such teaching in Foote et al.

In addition, the Advisory Action states that “Foote et al., column 12, lines 35-46, teach that there are areas [of the mask] that are opaque as well as transparent, and that the opaque areas can be a virtually any size, shape and arrangement, including that of a border.” Applicants respectfully submit that the cited passage does not teach that the opaque areas can be a border. Rather, Foote et al. teach at Col. 12, lines 41-44 that “[t]he opaque portions 534 of the mask 530 may, as shown, be circular and aligned in a close packed hexagonal arrangement to maximize the usable space on the substrate member 524 while maintaining the border areas” (emphasis added). Figure 5, to which the cited passage refers, is a top view of a flow cell for preparing an array. The opaque circular portions of the photolithographic mask at 534 prevent photolabilization of the corresponding regions of the substrate, while the transparent portions of the mask at 536 correspond to areas that will be photolabilized. Clearly, the cited passage and Figure 5 teach a flow cell containing a photolithographic mask having transparent portions surrounding opaque circular areas. Thus the conclusion in the Advisory Action that “Foote et al. fairly teaches use of a mask that can serve as a border around the reaction sites of an array” is incorrect. The cited passage and Figure 5 are directed to a flow cell, not an array, and the border areas around the circular areas in the flow cell correspond to a transparent area of the photolithographic mask.

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In response to Applicants' position that the photolithographic mask does not become part of the array of Foote et al., the Advisory Action states that "Figures 5 and 6 clearly depict an array that comprises a mask." Applicants disagree. Figures 5 and 6 depict a top view and a cross-sectional view, respectively, of a flow cell for preparing solid-state micro-scale arrays. Foote et al. at Col. 12, l. 3-5. Figures 5 and 6 do not depict an array of reaction sites and masking means between the sites, as claimed herein. Rather, Figures 5 and 6 depict a flow cell in which a photolithographic mask is placed adjacent to a substrate member. The mask as depicted in Figures 5 and 6 has circular opaque areas (534) surrounded by transparent portions (536). The flow cell is used to prepare a microarray that does not contain a photolithographic mask, and in which the boundary areas of the array are provided by non-photolabile blocking groups linked to the substrates, not by opaque areas of a mask.

Accordingly, there would have been no motivation to combine the teachings of Rava et al. with the teachings of Foote et al. Even if, arguendo, the references were combined, the combination thereof fails to achieve the present invention. Withdrawal of the rejection under 35 U.S.C. § 103(a) is respectfully requested.

Claims 37-39 have been objected to as dependent upon a rejected base claim. In view of the foregoing comments it is respectfully submitted that the base claims are allowable, and withdrawal of the objection is respectfully requested.

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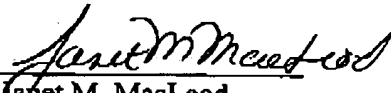
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Favorable reconsideration and allowance of all pending claims is earnestly solicited.

Respectfully submitted,

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Date: July 15, 2005

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